QUARTERLY REPORT

[redacted]

25X1

PAR 224
26 Feb 65

SUBJECT: 3 - 15X Fluid Gate Enlarger

TASK/PROBLEM

1. Develop and fabricate an enlarger having continuously variable magnification from 3 to 15X for 70mm negative gate size. Print sizes to range 40 x 40 inches on cut sheet stock.

DISCUSSION

2. The effort in this quarter has been to continue design and fabrication of a breadboard system which will provide engineering data for this project and also for PAR 202. The accomplishments have been:

a. Vacuum Platen and Carriage: The design and the detail drawings of the platen, the platen carriage, the carriage track and the carriage drive and position indexing system were completed and released for fabrication. Rough castings for the platen and carriage of the breadboard have been received and are being machined together with other parts of the assembly.

b. Lens Focus Table Unit: The assembly, which will display selected items in the table of magnification and lens focus settings was partially fabricated and studies made of a darkroom viewer system for the tabulation. The numbers displayed from the table are controlled by the platen position. The lens focus number displayed will be manually set on the lens assembly counter to produce the correct lens focus for that particular platen position.

c. Main Frame: The design and detail drawings of the lower frame and optical frame of the breadboard were completed. Requests were made to potential subcontractors to supply these units. Quotations were received just before the end of the quarter.

d. Fluid Gate: A rough breadboard test was made of a four-inch square vertical fluid gate. By using rectangular glass plates to form the gate and placing the plates in contact along the bottom edge with the top edge open before injecting immersion fluid, successful wetting of the full gate area, upon closing it, was achieved.

e. Lamphouse: The breadboard lamphouse design is approximately 90 percent complete and some detail drawings have been made. In order to facilitate changing the condenser lens, to be compatible with the objective lens being used, the lamphouse is being designed so that interchange of assemblies, containing the condenser lens assembly, the lamp and the lighttight enclosure, can be readily accomplished.

f. Objective Focus Assemblies: These assemblies are being designed to focus the lens with a "tensioned-thread" system as used in the 10-20-40X Precision Enlarger. Lens focus position is indicated by a four-dial digital counter. Coupling of the counter to the focus motion is matched to the focal sensitivity of each lens such that the "depth-of-focus" is represented by two to five counts. Lens assemblies including the focus mechanism and platen plates will be interchangeable. The design of these assemblies is about 75 percent complete. No detail drawings have been made.

g. Objective Lenses: The lens designers have confirmed that combination optical designs for color and black-and-white are possible for all of the required lenses required by both PAR 202 and PAR 224 except the 40X to 60X lens for the Briefing Print Enlarger, PAR 202. Formula sheets (optical designs) have been released for mount design and sample fabrication for all of the required seven (7) lenses.

h. Lens Focus Setting and Magnification Table: The computer program to calculate the values for the Focus/Magnification Table has been rewritten to make use of E.F. and front-focal-point to rear-focal-point separation from visual lens bench measurements in addition to the photographic

focus calibration measurements on the enlarger. This program was run successfully with hypothetical data and sample tables were generated for use by the designers. No further work with the program is planned until the breadboard enlarger and sample lenses are available to provide actual calibration data.

i. Negative Transport Model:

(1) Layout and detail design of back-illuminated transparent scales for X- and Y-coordinate indication were completed, parts for their drive mechanism fabricated and partially assembled to the negative transport model.

(2) Consideration of the causes of the random crowding of the flange on the takeup spool noted in the Second Quarterly Report, 30 November 1964, led us to propose a slatted, "non-steering" roller related to those used in the negative transport system of the 10-20-40X Enlarger, but providing (hopefully) lower steering force. A detail drawing of this roller design is being made and two models will be fabricated for test in the transport model.

j. Enlarger Control System: The circuit design has been started for the control system to be installed in the breadboard model. The presence of this system in the model will permit evaluation of human engineering factors which are particularly important to a successful darkroom instrument. In this system will be:

(1) An interlocked control of color filters and lamp intensity.

(2) An "integrated-transmittance" photometer to read an eight-inch diameter section of the image projected at the easel with "negative-classification" and "color-classification" controls related to the "grey-world" concept of color balance and exposure control being successfully used in commercial color print making, and

(3) An automatic sequence system to make sequential tri-color exposures as is desirable for high-quality color print making, or to make a

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single blue light exposure for the sharpest possible image in a black-and-white print.

The platen drive and positioning system is also being provided as a separate circuit.

PLANNED ACTIVITY

3. In the next quarter, we expect to:

a. Complete all phases of the design of the breadboard model.

b. Progress far enough in the fabrication of the breadboard model to begin the first engineering tests.

c. Accept delivery of the first three sample objective lens assemblies.